

Appl. No.: 10/657,969
Response dated 05/09/2006
Reply to Office action of 03/31/2006

REMARKS/ARGUMENTS

In the final Office Action dated March 31, 2006, Claims 1-19 are pending. Claims 1-4, 6, and 7 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,282,757 to Brussee. Claims 1-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Brussee in view of either U.S. Patent No. 4,854,988 to Voirol, et al. or U.S. Patent No. 5,227,208 to Thongs, Jr. Claims 1-6, 9-12, and 14-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,895,699 to Corbett, et al. in view of U.S. Patent No. 5,897,739 to Forster, et al. Claims 7, 8, and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Corbett, et al. in view of Forster, et al. and further view of any of Brussee, Voirol, or Thongs, Jr.

Applicant respectfully requests reconsideration in light of the following remarks.

Rejection of Claims 1-4, 6, and 7 under § 102(b) as being anticipated by Brussee

Claim 1 is directed to an apparatus for layup of a composite structure. The apparatus includes a mandrel that defines a layup surface for receiving the composite structure. The layup surface defines an inner portion, which generally corresponds to a desired contour of the composite structure, and a grip feature that is disposed on the layup surface and extends at least partially around the inner portion. In particular, the grip feature defines a retaining surface that is configured to retain the composite structure in a predetermined configuration during manufacture. As described in Applicant's previous Response filed February 22, 2006, Figures 3 and 4 of the application illustrate one exemplary embodiment of the invention in which the grip feature extends continuously around the inner portion.

Brussee is directed to a method of making a filament reinforced pressure vessel, and discloses that a plurality of strands **35** are wound on a distensible bladder **18**. End fittings **36, 37** are secured to the bladder, and each end fitting **36, 37** has an outer circumferential groove **38**. As shown in Figure 3, binding strands or wires **48** are wrapped around the strands **35** in the groove to secure the strands **35** to the fitting **36, 37**.

The Office Action takes that position that Brussee suggests a lay up surface that includes the end fittings **36, 37** and the bladder **18**. *See* Office Action, page 3. The Office Action also states that "the bladder **18** defined the contour of the vessel" and "the end fittings **36, 37** included a groove over which the composite material was laid and into which one disposed a binding

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thread in order to retain the longitudinally extending fibers within the groove and on the bladder lay up surface.” Office Action, page 3. Further, the Office Action states:

Additionally, the grip features (the end fittings 36, 37) were disposed about the bladder at the ends of the windings and thus the grip features clearly extended at least partially around the inner portion (they completely surrounded the inner portion at the ends of the inner portion). One could view the inner portion to be the entire assembly of the bladder and the end fittings. In this instance the retaining portions are at least partially around the inner portion as they are at least at the ends of the body which make up a portion of the surround of the inner portion of the mandrel.

Office Action, page 3.

Thus, Applicant understands that the Examiner considers the end fittings **36, 37** to define part of a lay up surface of a mandrel that also includes the bladder, and also considers the end fittings **36, 37** to define a grip feature that extends at least partially around an inner portion of the layup surface that corresponds to the desired contour of the composite structure.

Applicant respectfully disagrees with this characterization. As previously noted by Applicant, the circumferential groove in each fitting **36, 37** does not even partially encircle or surround the surface of the bladder. Moreover, even if the fittings themselves are considered to define a portion of the layup surface, the fittings do not define an inner portion of the layup surface around which (or partially around which) the grooves extend. If the fittings are considered to be part of the layup surface, the grooves in the fittings are the radially innermost portion of the layup surface. In other words, the grooves in the fittings do not extend even partially around any other portion of the layup surface, i.e., an inner portion of the layup surface, as claimed.

In the above quotation, the Office Action asserts that if the inner portion is viewed as including the entire assembly of the bladder and the end fittings, then “the retaining portions are at least partially around the inner portion as they are at least at the ends of the body which make up a portion of the surround of the inner portion of the mandrel.” The “inner portion” that is recited in Claim 1 is a portion of a surface. In particular, the inner portion is a portion of the layup surface that generally corresponds to a desired contour of the composite structure. The grooves of the fittings of the device of Brussee do not extend around any such inner portion of a

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layup surface. Indeed, even if the grooves themselves are considered to be part of the layup surface as set forth in the Office Action, the grooves are the radially innermost portion of that layup surface. No portion of the layup surface is disposed inward of the grooves, and the grooves do not extend around any portion of the layup surface. The only portion of the bladder that is radially inward of the grooves in the fittings is the ends of the bladder that are covered by the fittings. The end of the bladder that is covered by each fitting cannot be considered to be the claimed inner portion because the end of the bladder is not a surface “generally corresponding to a desired contour of the composite structure,” as claimed. Moreover, the end of the bladder is not “a layup surface for receiving the composite structure thereon,” as claimed.

Accordingly, Applicant submits that Claim 1 is allowable over Brussee, as are each of the dependent claims.

The dependent claims also provide additional bases of distinction over the cited references. For example, dependent Claim 3 recites that “the retaining surface [which is defined by the grip feature and configured to retain the composite structure in a predetermined configuration during manufacture] is generally perpendicular to the layup surface and defines an edge with the layup surface, the retaining surface and the edge configured to engage the composite structure.” In this regard, the Office Action states:

Regarding claim 3, the reference clearly included retaining grooves therein which acted in the same manner as the claimed retaining means and included an edge which met with the bladder therein.

Office Action, page 4.

Applicant disagrees. Brussee does not disclose that the grooves in the end fitting defines a retaining surface that is generally perpendicular to the layup surface and defines an edge with the layup surface so that the edge is configured to engage the composite structure,” as claimed. Indeed, the Office Action does not assert that Brussee discloses this feature, but instead states that the grooves “included an edge which met with the bladder.” Further, Applicant respectfully disagrees with the Office Action’s characterization of Brussee, that the retaining grooves “acted in the same manner as the claimed retaining means.” Claim 3 clearly recites a configuration in which the grip feature defines a retaining surface that defines an edge with the layup surface so

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that the edge is configured to engage the composite structure and the grip feature can thereby retain the composite structure in a predetermined configuration. Brussee, on the other hand, does not disclose such an edge and instead requires the use of a binding strand or wire 48 disposed in the circumferential groove of each fitting.

Dependent Claim 7 further recites that “the layup surface defines an outer peripheral portion outward of the inner portion and wherein the grip feature is a grip groove disposed in the layup surface and defining a boundary between the inner portion and the outer peripheral portion of the layup surface.” In this regard, the Office Action states:

The application is advised that the reference clearly defined a groove for the retaining surface and that the groove was disposed about the periphery of where the material was being applied (the inner lay up surface) and the regions where no composite material was to be applied outside of the lay up region (the outer surface).

Office Action, page 5.

Applicant respectfully disagrees. Brussee does not describe a layup surface that extends both inward and outward of the groove.

Rejection of Claims 1-8 under § 103(a) as being unpatentable over Brussee in view of either Voirol, et al. or Thongs, Jr.

The final Office Action refers to paragraph 4 of the Office Action dated December 20, 2005. Paragraph 4 of the earlier Office Action refers to Voirol, et al. and Thongs, Jr. as “suggest[ing] that one skilled in the art at the time the invention was made would have known to provide a groove with a tapered wall wherein the groove was for retaining a mandrel part wherein filaments were also wound into the groove and retained therein as taught by either reference to Voirol or Thongs.”

Nevertheless, as set forth above, Brussee does not disclose each of the features of Claim 1 of the present invention. Further, neither Voirol, et al. or Thongs, Jr. cures the deficiencies of Brussee. That is, even if retaining grooves of Voirol, et al. or Thongs, Jr. were employed in the processing and system of Brussee, as asserted in the Office Action, the claimed configuration would not result. That is, the layup surface would not define an inner portion that generally

corresponds to a desired contour of the composite structure with a grip feature extending at least partially around the inner portion, as claimed.

Accordingly, Applicant submits that Claim 1 is allowable over Brussee, even in fair combination with Voirol, et al. or Thongs, Jr., as are each of the dependent Claims 2-8.

Rejection of Claims 1-6, 9-12, and 14-19 under § 103(a) as being unpatentable over Corbett, et al. in view of Forster, et al.

Neither Corbett, et al. nor Forster, et al. discloses the above-noted features of Claim 1. That is, neither reference teaches or suggests a layup surface that defines an inner portion generally corresponding to a desired contour of the composite structure and a grip feature disposed on the layup surface and extending at least partially around the inner portion. Accordingly, Claim 1 is allowable over these references for the same reasons set forth above.

Independent Claim 9 is directed to a method for retaining a composite structure during manufacture. The method includes “providing a mandrel having a layup surface for receiving the composite structure thereon, the layup surface having an inner portion and a grip feature defining a retaining surface extending at least partially around the inner portion.” A composite preform is assembled on the layup surface, and at least one tiedown ply of the preform is adhered to the mandrel with a film adhesive applied at the grip feature. The film adhesive has a cure temperature that is lower than a cure temperature of a resin of the laminate.

The final Office Action refers to the rejection set forth in the Office Action dated December 20, 2005. The earlier Office Action states that Corbett, et al. “was silent as to the use of a retaining means for retaining the tie down ply in position which means included a retaining element on the surface of the mandrel or tooling.” Office Action dated December 20, 2005, page 5. However, the Office Action further states that it would have been obvious “to provide a hold down means about the exterior region of the mandrel defining part forming surface wherein the same included a means for retaining the composite plies there against as suggested by Forster in the process of making a composite assembly as taught by Corbett.” Id. The “hold down means” referred to in the Office Action is “a perforated or apertured metal strip 140” for which Forster, et al. states that “laborious cleaning is required to remove excess resin from the apertures 142

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prior to initiating the next cure cycle.” Col. 2, lines 61-65. Indeed, as previously stated, this and other disadvantages of such a device are noted in the present application at paragraph 7.

The final Office Action states “that here the use of the retaining feature was known and in the public domain at the time the invention was made as evidenced by Foster et al. the fact that there was some disadvantage to utilizing the known gripping and retaining mechanisms in the prior art would not have deterred one skilled in the art from utilizing the same with the known benefits of having the retaining means there.” Office Action, page 6.

Applicant acknowledges the teachings set forth in Forster, et al. but respectfully submits that the selective combination of this feature of Forster, et al. for modification of Corbett, et al. is improper, especially where Forster, et al. specifically teaches away from the use of that feature. In other words, a person of ordinary skill in the art would not have been motivated to take a feature specifically disparaged by Forster, et al. and incorporate that feature into Corbett, et al. The Court of Appeals for the Federal Circuit has held that a prior art reference should be considered as a whole and portions teaching away from the claimed invention must be considered. *See, e.g., Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443 (Fed. Cir. 1986) (noting that the lower court erred in failing to consider a prior art reference in its entirety and thereby ignoring portions of the reference that argued against obviousness); *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565 (Fed. Cir. 1986), *reversed on other grounds* (“[T]he inventor achieved the invention set forth in claim 30 by doing what those skilled in the art suggested should not be done, i.e., using lower temperatures, a fact strongly probative of nonobviousness.”)

The final Office Action states that “one cannot obtain a patent for that which is already in the public domain.” Office Action, page 6. However, the Office Action has not shown a disclosure of the invention of Claim 9 in the cited references. Instead, the Office Action maintains that the individual elements of Claim 9 are disclosed by different references and rejects Claim 9 under § 103 on the basis that a modification of Corbett, et al. to include a perforated or apertured metal strip would have been obvious in light of Forster, et al. Applicant traverses on the basis that the modification of Corbett, et al. would not have been obvious, especially in light of the clear teaching away from the use of a perforated or apertured metal strip by Forster, et al.

Further, the Office Action acknowledges that "each individual hole [of the perforated or apertured metal strip of Forster, et al.] did not provide a groove which extended completely about the assembly" but states that "one taking a fair reading from what is taught by the reference would have understood that the ripping strips would have been disposed completely about the assembly and that in combination, the plurality of holes would have provided a retaining surface which was disposed completely about the surface being molded." Office Action, page 6.

Applicant disagrees with the characterization of multiple holes as defining a single retaining surface that extends at least partially around the inner portion of the layup surface as claimed. The surfaces provided by the combination of multiple holes are not a surface as claimed. Further, the significant difference between a single retaining surface and a combination of the multiple surfaces provided by many holes is evident from the disadvantages described in the background of the present application resulting from the use of a grip strip (or use of a metal strip of Forster, et al.).

The method of Claim 9 also includes adhering at least one tiedown ply of the preform to the mandrel "with a film adhesive applied at the grip feature such that the tiedown ply is retained by the grip feature in a predetermined configuration," the film adhesive having a cure temperature that is lower than a cure temperature of a resin of the laminate. The Office Action refers in this regard to the film adhesive **180** of Corbett, et al.; however, Corbett, et al. discloses that the film adhesive **180** is incorporated "between the tiedown plies" and does not teach or suggest that the film adhesive is used to adhere the tiedown plies to the mandrel and, in particular, to a grip feature of the mandrel, as claimed.

Further, with regard to the feature of Claim 9 that "the film adhesive is characterized by a cure temperature lower than a cure temperature of the resin of the laminate," the Office Action asserts that "the curing cycle typically heats the plies to 235 degrees C while the low curing temperature resin [i.e., the film adhesive **180**] cured at 121 degrees C." Office Action, page 7. The Office Action is apparently relying on the teaching of Corbett, et al. in column 5, lines 30-34, where Corbett, et al. refers to a preconditioning operation in which the core is heated to about 235° C prior to laying up the sandwich panel to eliminate volatile evolution during curing. This is not a description of the curing operation of Corbett, et al. Indeed, Corbett, et al. does not

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describe a curing temperature that exceeds the cure temperature of the film adhesive. Moreover, as set forth in Applicant's previous Amendment, Corbett, et al. specifically teaches away from a "staged cure cycle" that requires stages at different temperatures.

Accordingly, for each of these reasons, Applicant submits that Claim 9 is allowable over the cited references, as are each of the dependent Claims 10-19.

Rejection of Claims 7, 8, and 13 under § 103(a) as being unpatentable over Corbett, et al. in view of Forster, et al. and further view of any of Brussee, Voirol, or Thongs, Jr.

Each of these dependent claims is allowable for the reasons set forth above in connection with the respective independent Claims. That is, Corbett, et al. and Forster, et al. cannot be fairly combined to achieve the invention of Claims 1 or 9. Further, none of Brussee, Voirol, or Thongs, Jr. cure the above noted deficiencies of Corbett, et al. and Forster, et al.

* * * *

CONCLUSIONS

In view of the remarks presented above, Applicant submits that each of Claims 1-19 of the present application is in condition for allowance. As such, the issuance of a Notice of Allowance is therefore respectfully requested. In order to expedite the examination of the present application, the Examiner is encouraged to contact Applicant's undersigned attorney in order to resolve any remaining issues.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required

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therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit
Account No. 16-0605.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Nick Gallo".

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